

Result On Effectiveness Assessment Of The Adaptation Actions In Quang Ngai, Viet Nam

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Abstract: To cope with the impact of climate change over the past years, Quang Ngai Province, Viet Nam has implemented responding measures including developing action plans to respond to climate change and implementing some adaptation actions. However, the effectiveness of these adaptation actions has not only been fully assessed in Quang Ngai province but also in the whole country. In order to assess the effectiveness of the adaptation activities in order to adjust direction of development the new activities to response to climate change impacts, the process for assessing the effectiveness of the adaptation actions have been developed based on the Result Based Management Method (RBM) and the Delphi Technique. This process is applied to assess the effectiveness of "Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province" project. The initial results show that the project has certain effectiveness on the socio-economic development aspect and climate change response. It is necessary to continue to access the effectiveness of the adaptation capability of the project to have more concrete results and to see the long-term effectiveness of the project.

Index Terms: Effectiveness assessment, adaptation, RBM, Delphi, Quang Ngai.

1 Introduction

Transparency Framework under the Paris Agreement includes the information related to the mitigation of the Parties; the mitigation and adaptation actions as well as the support on received/given finance, technology and capacity building [5]. To report the implemented adaptation actions, research on the assessment on the effectiveness of adaptation actions (AEAA) is required. Based on the research on AEAA, the advantages and disadvantages of the international and national AEAA have been summarized and analyzed by group of researchers. With the purpose of assessing on the effectiveness of the adaptation actions at local scale, the 6-step process for assessing the effectiveness of the adaptation actions has been studied and developed based on the RBM and the Delphi Technique [4]. The assessment on the effectiveness of adaptation actions at local scale helps to contribute to the country's report on result of the adaptation measures that identified under the adaptation component of Nationally Determined Contribution.

From 2011, to cope with climate change, Quang Ngai province has developed the Action Plan to respond to Climate Change for the period 2011-2020. Following the action plan, Quang Ngai's People Committee has approved the "Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province" project. The objectives of this project are to prevent soil erosion, to enhance the protective capacity, to regulate the climate, to protect the coastal ecosystem, to prevent saltwater intrusion, to protect groundwater in the area, and to create the livelihood for local people. The expected project's results are to plant new 100 ha forest and to restore 30 ha of the coastal protective forest in Binh Thuan Commune in order to contribute to the safety of life and property of about 850 households, 3,200 people especially in the rainy season [6]. This paper applied the process for assessing the effectiveness of the forestry project implemented in Quang Ngai province on its adaptation to climate change.

2 THE PROCESS FOR ASSESSING THE EFFECTIVENESS OF THE ADAPTATION ACTIONS

Based on the analysis of the advantages and disadvantages of the international and domestic methodologies [2], this study proposed the process for assessing the effectiveness of adaptation actions including 06 steps (Figure 1) [4]

Step 1. Develop the monitoring indicators for adaptation actions: The indicators are divided into 03 groups to assess the effectiveness of adaptation: (i) Adaptive Capacity (AC), (ii) Adaptation Actions (AAs), (iii) Sustainable Development (SD).

Step 2. Develop the questionnaires to verify the progress/result of implementation of adaptation actions: The questionnaires should follow the RBM indicators. The adaptation actions are mainly implemented in the community site. Therefore the questionnaires should be easy to understand and answer to gain the interviews results as expected.

Step 3. Implement the survey on the progress/result of implementation of adaptation actions: Based on the developed questionnaires in Step 2, the survey is conducted to explore the results of adaptation actions at the community.

Step 4. Analyse data: The obtained questionnaires after interview are analyzed, summarized in the group of indicators. The results are converted to unit for each indicator.

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Step 5. Develop the baseline of the adaptation action: The baseline shows the status of vulnerability and adapt capacity, based on which the changes after implementation of adaptation are assessable. The baseline in this research is identified based on the status of each indicator from 3 groups before implementing the adaptation action.

Step 6. Compare the result of adaptation action with the baseline: The comparison of the adaptation actions before and after implementation shows the effectiveness of the adaptation actions.

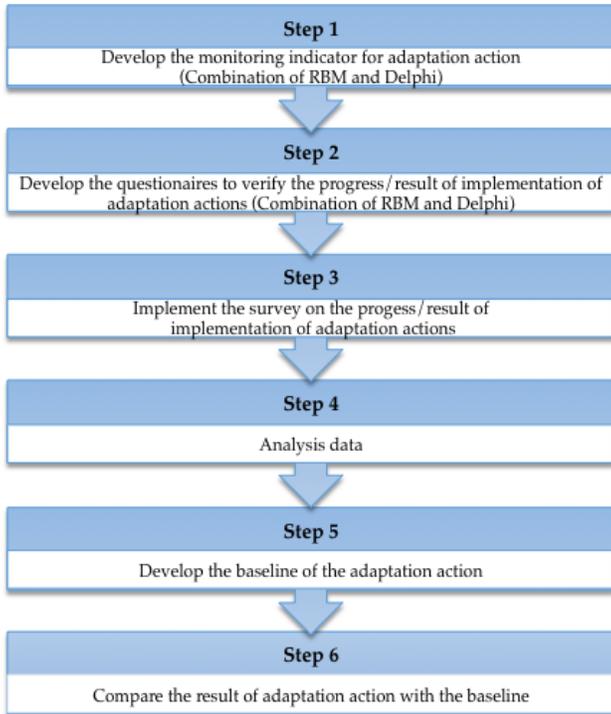


Fig1. Process for assessing the effectiveness of the adaptation actions

3 ASSESS THE EFFECTIVENESS OF THE ADAPTATION ACTION IN QUANG NGAI PROVINCE, VIET NAM

a) Step 1. Develop the monitoring indicator for adaptation action (Combination of RBM and Delphi)

The set of monitoring indicators was developed to check the result of implementation in the short period of time. The RBM was applied and the indicators were arranged in 3 groups: Adaptive Capacity (AC), Adaptation Actions (AAs), Sustainable Development (SD). The group of AC helps to improve the adaptive capacity of people, to provide the information to adjust to changing climate conditions. The measures could be setting up the coordination agencies for cross cutting issues or improving people's adaptability. The group of AAs is to respond to climate change risks, adaptive capacity needs to be strengthened through specific actions and decisions. These actions can reduce directly or manage the physiological effects of climate change or address factors that contribute to reducing vulnerability. For the SD indicators, the final purpose is to enhance the economy and health of people in the context of climate change impact through reducing the number of victims of diseases caused by climate change or increasing the people's income [7] The indicators for monitoring and assessing the effectiveness of the

adaptation action are presented in Table 1. The selected experts were requested to rank the the level of agreement on the indicators through 2 rounds of the Delphi Technique. The level of agreement was ranked from 1 to 5 as follow: (1) means highly irrelevant; (2) means likely irrelevant; (3) means more or less relevant; (4) means likely relevant; (5) means highly relevant. Based on the rating results, a Rating Median (Md), Quartile deviation (Q), Rating Mean and Rating Variance (%) were calculated. The analysis was based on the rules of the Delphi Technique as used in a KAMET set up and shown in Table 2 [4].

TABLE 1: THE INDICATORS FOR MONITORING AND ASSESSING THE EFFECTIVENESS OF THE ADAPTATION ACTIONS

Group of Adaptive Capacity Indicators (AC)	AC1. Percentage of mangrove forests of the total natural land area;
	AC2. Salinity;
	AC3. Percentage of saltwater intrusion area;
	AC4. Damage Level;
	AC5. Percentage of households protected from floods compared to the target (850 households);
Group of Adaptation Actions Indicators (AAs)	AAs1. Percentage of new planted mangrove forests compared to the target;
	AAs2. Percentage of restored mangrove forests compared to the target (30 ha);
Group of Sustainable Development Indicators (SD)	SD1. Percentage of local population to get benefit directly from the adaptation action;
	SD2. Enhancing diversity of coastal ecosystems;
	SD3. Reducing the process of coastal erosion, wave barrier, sand barrier

TABLE 2: RULE FOR ANALYSING THE RATINGS FROM MULTIPLE EXPERTS WITH DELPHI APPROACH [1]

Round t	Round t + 1	Round t + 2
Rating mean (qi) ≥ 3.5	If rating mean (qi) ≥ 3.5 and Q ≤ 0.5 and rating variance (qi) < 15% then qi is accepted, and no further discussion concerning qi, is needed.	
Rating mean (qi) < 3.5	Rating mean (qi) ≥ 3.5 and rating variance (qi) < 15%. If Rating mean (qi) < 3.5 and Q ≤ 0.5 and rating variance (qi) ≤ 15% then qi is rejected, and no further discussion concerning qi, is needed.	If rating mean (qi) ≥ 3.5 and Q ≤ 0.5 and rating variance (qi) ≤ 15% then qi is accepted, and no further discussion concerning qi, is needed.
Note: Rating mean (qi): the mean of the ratings for questionnaire item qi and Rating variance (qi): the ratio of experts who change their ratings for qi and Q is the quartile.		

The result showed that 8 out of 10 indicators were selected and ranked from 4-5 (likely relevant to highly relevant) and 2 indicators were rated from 3-4 (more or less relevant to likely relevant). Experts' comments on AC2 and AC3 indicators were very difficult to measure at this stage due to the lack of equipments and time so these 2 indicators were not used under this research [3]. Suitability of Monitoring indicators through 2 rounds of Delphi Technique are stated in Figure 2. It shows that the rating mean of AC2 (Salinity) and AC3 (Percentage of saltwater intrusion areas) after 2 rounds are under the green line (rating mean qi); the rating variance of AC2 and AC3 are above the purple line (the rating variance (%) from 0-30%). So both AC2 and AC3 were rejected and not apply in the next steps of process for assessing the effectiveness of the adaptation actions. These results were the same as on the expert's comments.

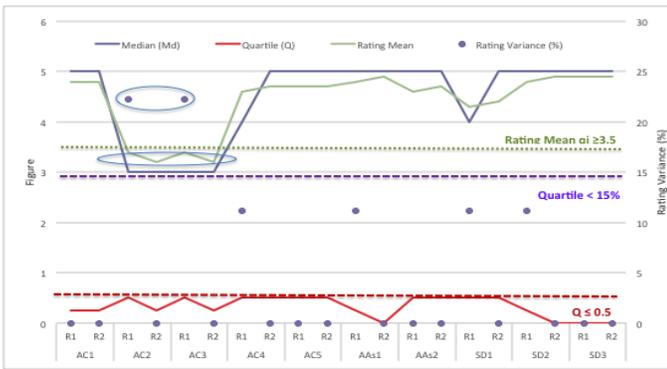


Fig 2. Suitability of Monitoring indicators of “Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province” project

Fig 3. The suitability of the questionnaires for forestation project

b) Step 2. Develop the questionnaires to verify the progress/result of implementation of adaptation actions (Combination of RBM and Delphi)
 The development of the indicator was similar to the development of the indicator in Step 1. The sixteen questionnaires were sent to the expert panel for comments. The results shown that the 16 questions meet the KAMET’s rule and it was not necessary for further consultation. These questionnaires were used for consultation are presented in Table 3. The Figure 3 stated the suitability of the questionnaires for the “Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province”.

c) Step 3: Implement the survey on the progress/result of implementation of adaptation actions
 Sixty interviewees from Binh Thuan Commune (48 people who lives at Binh Thuan Commune); Hydraulic and Flood Control Division (6 people: Head and officials of the Division); Quang Ngai’s Department of Natural Resources and Environment (Leaders and officials, technical experts under the Department); Quang Ngai’s People Committee (06 people: the officials of the People Committee) were interviewed.
 d) Step 4: Develop the baseline of the adaptation action
 The obtained results from the interview were summarized. The points were given following the different ranking to compare to the adaptive status of each indicators before implementing the project. The result is shown in the Table 4.

TABLE 3: THE QUESTIONNAIRES TO VERIFY THE RESULT ON THE IMPLEMENTATION OF THE FORESTRY PROJECT

Group of Indicators	Indicators
AC1a	The boundary of mangrove forest before the project’s implementation
AC1b	The boundary of mangrove forest after the project’s implementation
AC4a	Damage due to storm in 2013 (before project’s implementation)
AC4b	Damage due to storm in 2016 (after project’s implementation)
AC5a	The level of family protection from floods in 2013 (before project’s implementation)
AC5b	The level of family protection from floods in 2016 (after project’s implementation)
AAs1a	The new area of mangroves before the implementation of project
AAs1b	The new area of mangroves after the implementation of project
AAs2a	Area of local aquaculture in 2013 (before project’s implementation)
AAs2b	Area of local aquaculture in 2016 (after project’s implementation)
SD1a	Number of people who stay in or out of town for job hunting before project’s implementation
SD1b	Number of people who stay in or out of town for job hunting after project’s implementation
SD2a	Number of species harvested before project implementation
SD2b	Number of species harvested after project implementation
SD3a	Coastal / sea dike position collapsed in 2013
SD3b	Coastal / sea dike position collapsed in 2016

TABLE 4: THE EFFECTIVENESS OF THE "REFORESTATION AND RESTORATION OF COASTAL MANGROVES IN BINH THUAN COMMUNE, BINH SON DISTRICT, QUANG NGAI PROVINCE" PROJECT

Indicator	Symbol	Monitoring Indicators	Unit	Data in 2013	Figure in 2013	Date in 2016	Figure in 2016
Adaptation Capacity	AC1	- Percentage of mangrove forests of the total natural land area: Not any (0): 0%; Little (1): 0-5%; Medium (2): 5- 10%; High (3): 10-15%; Very high (4): 15-20%	%	0.9%	1	7%	2
	AC4	- Damage Level Complete damage: > 70% (0); Very heavy damage: 50-70% (1); Heavy damage: 30 - 50% (2) Partial damage: (3); No Damage: 0% (4)	%	35%	2		3
	AC5	- Percentage of households protected from floods compared to the target (850 households): Not any (0): 0%; Few (1): 0-25%; Medium (2): 26- 50%; High (3): 51-75%; Very high (4): 76-100%	%	5%	1	100	4
Adaptation Action	AAs1	- Percentage of newly planted mangrove forests compared to the target (100 ha): Not yet implemented: 0% (0); Newly implemented: 1- 50% (1); Nearly completed: 51-99%; (2) Completed: 100% (3)	%	1-50%	0	100	3
	AAs2	- Percentage of restored mangrove forests compared to the target (30 ha): Not yet implemented: 0% (0); Ongoing: 1-50% (1); Nearly completed: 51-99% (2); Completed: 100% (3)	%	1-50%	1	100	3
Sustainable Development	SD1	- Percentage of local population to get benefit directly from the adaptation action: Noone: 0% (0); Small part of the population: 1- 30%: (1); Large part of the population: 31- 70% (2); The entire population: 71-100% (3)	%	No one	0	A Part of population	1
	SD2	- Enhancing diversity of coastal ecosystems: None: (0); A part: (0.5); Yes: (1)	Yes/A part/None	A Part	0,5	Yes	1
	SD3	- Reducing the process of coastal erosion, wave barrier, sand barrier: None: (0); A part: (0.5); Yes: (1)	Yes/A part/None	None	0	Yes	1

e) Step 5: Develop the baseline of the adaptation action

The baseline of the project was identified in 2013. The base year provides the sufficient data. In addition to that, 2013 data represents the climate conditions before the project's implementation. The base line shows the status of the indicators before implementing the project. During the monitoring and evaluation process, the indicators were assessed on the result of implementation. For the quantified indicators, the ranking was referred from the guideline to assess the damage caused by the disaster and the expert's view. For the non-quantified indicators, the ranking is based on the answer of None/A part/Yes and standardized to equivalent unit (0; 0.5 and 1). The given points are showed in the Step 6.

f) Step 6: Compare the result of adaptation action with the baseline. The result of the assessment were shown that:

For the group of adaptation capacity indicator: (i) AC1: the forest area in 2013 was 14.66 ha accounting for 0.9% of the total forest in the commune. The percentage of the mangrove area planted through the project in 2016 was 130 ha accounting for 7% of the total forest in the commune. Referring to the ranking, the indicator of the mangrove forest was given 1 and 2 points in 2013 and 2016 respectively; (ii) AC4: The result showed that the damage level of the property in 2013 was assessed higher than the damage level in 2016. Therefore the damage level was given 2 and 3 points in 2013

and 2016 respectively; (iii) AC5: The project was implemented in 2013 but there were flood control programs/plans in the province. Hence the ratio of the household protected from the flood compared to the target was given 1 point. The ratio of the damage was less. Therefore this indicator was given 4 points in 2016. For the group of adaptation action indicators: Although the project has not started in 2013, a part of mangrove forest was existed in the province, so the indicator AAs1 was given 1.5 point, AAs2 was given 0 point. According to the report of Quang Ngai's Natural Resources and Environment Department, and result of the survey, the project has fulfilled the target of planting 100 ha of new mangroves and restored 30 ha of mangroves. Therefore both AAs1 and AAs2 were given 3 points. For the group of sustainable development indicators: During the implementation period, the project management unit had hired the local people to implement the project's activity including the planting and managing the mangrove forest. The co-benefit of project's implementation was increasing the household's income and protection from flood and salt intrusion. However not all the households have got benefit from the project. Therefore the indicator SD1 and SD3 were given 1 point in 2016. Meanwhile the point of 2 indicators in 2013 was zero. For indicator SD2, there were a few species of bird migrating to the commune, so this indicator was given 0.5 point in 2013. Through the interview, as indicated by the local people, the species of bird

increased in 2016, so this indicator was given 1 point. From the above results, the indicators in 2016 are higher than in 2013 and the project has achieved the initial target basically. The group of adaptation capacity, adaptation actions and sustainable development indicators had values of 4, 1, and 0.5 in 2013 respectively. According to the result of assessment, the values of the indicators in 2016 were 9, 6, and 3. The effectiveness of the “Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province” project are stated in Figure 4.

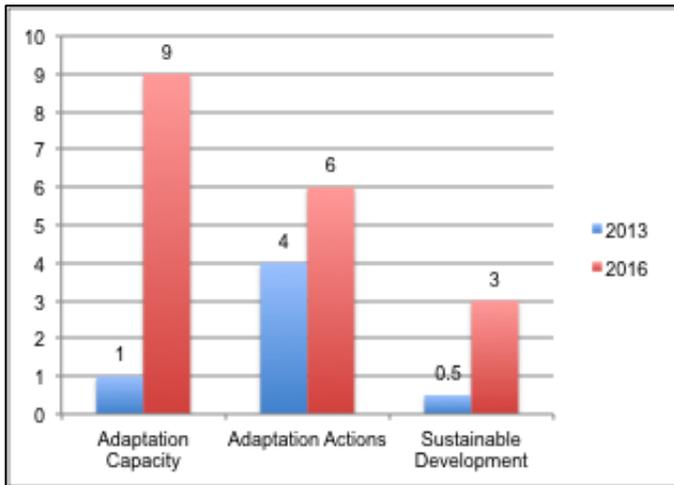


Fig 4. The effectiveness of “Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province” project

4 CONCLUSION

The process for assessing the effectiveness of the adaptation actions has been applied to assess the effectiveness of the “Reforestation and Restoration of Coastal Mangroves in Binh Thuan Commune, Binh Son District, Quang Ngai province” project. The initial results showed that the indicators were higher than the base year in 2013 and meet the set target basically. However it is recommended to continue to apply the process to see the long term effectiveness of the adaptation actions. The effective implementation of adaptation actions helps to extend the project in the next period or to mobilize resources to implement the similar projects in the province contributing to the country’s effort to implement the adaptation actions and Nationally Determine Contribution (NDC).

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